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ABSTRACT

As part of a desegregation plan in Detroit, teachers in recently desegregated schools were involved in an in-service program designed to provide for equal instructional opportunity. One hundred fifty-eight elementary teachers, 99 middle school teachers, and 49 high school teachers in 306 classrooms participated in the program. Teacher -student interactions were examined in a series of 4 way ANOVA tests. The report indicated that black students received a greater proportion of questions from teachers than did white students. They also answered fewer questions, received more criticism from teachers for their behavior, and had more self-initiated questions or relevant comments. The results of the study indicated that black students and males received a greater proportion of the classroom interactions than did white students or females. Both male and female teachers acted in similar ways with males and females. A "cross-race" effect between white teachers and their students was also noted, with black students receiving a disproportionate number of interactions. Tables which present breakdowns of teachers' sex, race, grade level, and patterns of teacher-student interactions are included. (Author/JP)

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TEACHER BEHAVIOR IN DESEGREGATED SCHOOLS[1]

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Abstract

Teacher Behavior in Desegregated Schools

As part of the desegregation plan in the City of Detroit, teachers in recently desegregated schools were involved in an in-service program designed to provide for equal instructional opportunity in each of the involved classrooms. As part of this program teacher-student interaction data were collected in each teacher's classroom using the Brophy-Good Interaction System. These data were standardized for each classroom to produce an index of the extent to which the allocation of instructional opportunities was proportionate to the distribution of students in the class. The results of this study indicated that Black students and males received a greater proportion of the classroom interactions than did white students or females, and that both male and female teachers acted in very similar ways with male and female students. A "cross-race" effect between white teachers and their students was also noted, with Black students receiving a disproportionate number of interactions.

Teacher Behavior in Desegregated Schools

Teacher-student interactions in the classroom are at best uneven with some students receiving greater quantities of teacher contact than others (Good, 1970; Jackson & Lahaderne, 1967; Kranz, Weber & Fishell, Note 1; Mendoza, Good, & Brophy, Note 2). Several studies have also shown some students to receive quantitatively superior treatment from their teachers (Brophy & Good, 1970; deGroat & Thompson, 1949; Good & Brophy, 1972; Rist, 1970; Rowe, 1969; Silberman, 1969). As has been pointed out elsewhere (Good & Brophy, 1971) previous investigators have consistently been able to demonstrate the effects of differential teacher behavior toward students differing on characteristics such as achievement level, sex or socio-economic level. These kinds of studies acquire particular significance when extended to situations involving the variables of student and teacher race.

Though the Brown vs. Board of Education (1954) school desegregation decision has had wide impact with regard to the integration of American schools for the purpose of providing for equal educational opportunity, it continues to remain an unanswered question as to whether or not black and white children receive the same quantity and quality of instruction even though they are in the same classroom. Previous research on a number of other student characteristics as they effect instruction, clearly suggests that race may be an extremely important variable. Indeed, several studies have already examined the variables of teacher and student racial and ethnic variables as

they influence the quantity and quality of classroom interaction (e.g. Byalick & Bersoff, 1974; Gay, Note 3; Jackson & Cosca, 1974; Rubovits & Maehr, 1973; U.S. Civil Rights Commission, Note 4).

Rubovits and Maehr (1973) report what they call a "disturbing instance of white racism" in that Black students in their sample were given less attention, were ignored more, praised less and criticized more than white students by the sample of white teachers. Their results indicated that white students received far more attention in general than did the Black students. Using a sample of both white and Black teachers, Byalick and Bersoff (1974) in their study of reinforcement practices in integrated classrooms, found that teachers reinforced opposite-raced children more frequently than they did children of their own race.

The U.S. Civil Rights Commission (Note 4) in a series of studies on the education of Mexican-American youth in the Southwest found disparities in teachers' behavior with Anglo and Chicano students in six of the categories on the Flanders System of Interaction Analysis and in each case the treatment was in the favor of the Anglo students. A study by Jackson & Cosca (1974) using a modified version of the same observation system, supports these results by finding significant disparities in favor of Anglo vs. Chicago students on each of the following three variables: teachers' use of praise, acceptance or use of Anglo ideas, and number of questions directed toward students. In both of these studies, Anglo and Mexican-American teachers were

both found to provide more favorable treatment to Anglo students than to those who were Mexican-American.

Gay's (Note 3) research on teacher behavior with Black and white students demonstrated that all teachers acted similarly in differentiating their verbal behaviors with Black and white students, that Black students did not participate as often as white students in class discussions, and that white students participated in more academic and substantive ways, and received more encouragement and praise from teachers, while Blacks participated more in procedural and behavioral or discipline interactions. According to Gay (1975) it makes little difference whether teachers are Black or white, or teaching elementary or secondary classes, they expect the quality of white students' classroom participation to be better than Black students'.

Aware of the research findings which indicated student ethnicity to be a major determinant of teachers' expectations and interactional behaviors, and the results of a local survey (Detroit Public Schools, Note 5) suggesting that teachers did not believe that they had different expectations for Black and white students, and faced with a court-ordered desegregation plan to be implemented in February, 1976, the Detroit Public Schools undertook a large scale in-service program through which it hoped to insure the delivery of equal quality education to Black and white students alike.

This In-Service Training Program for Detroit teachers in recently desegregated schools took place in four stages. During the

first stage, 1500 teachers from 80 schools attended, on a voluntary basis, one of five weekend meetings. The purpose of these meetings was to deal with the effects of teacher expectations, beliefs and attitudes on pupil behavior. More specifically, these meetings focused upon teaching in a multi-racial, multi-ethnic school system with presentations and exercises having knowledge and attitude as opposed to skill development objectives. The major purpose of these weekend workshops was to establish enough rapport between the teachers, the meeting leaders, and coder-observers so that the teachers would be willing to participate in what was expected to be the major part of the treatment and allow themselves to be observed while teaching a lesson in their class.

Following these weekends, trained observers entered the classrooms of the participating teachers and coded the interaction between these teachers and their students. The participating teachers represented all grade levels, kindergarten through 12th grade. The observation system, a modified version of the Brophy-Good Interaction Coding System (Brophy & Good, 1970), produced descriptive information on the nature of this teacher-student interaction with specific information concerning teacher questioning patterns, feedback methods, reinforcement and criticism patterns as well as indices of pupil behavior and misbehavior.

Following this initial observation these descriptive data were shared with each of the teachers as a way of describing to them the

nature of their interaction with their students. Previous research by Good and Brophy (1974) has shown that this form of feedback can be very helpful in producing changes in teacher behavior where necessary.

Following this feedback coders then re-entered these classrooms in order to make another observation of teacher-student interaction in an attempt to determine to what extent feedback to the teacher had effected their interaction patterns. The data reported in this study include only those collected during the first set of classroom observations, and are descriptive interaction patterns in a multi-racial urban setting, as well as a set of pre-observations or baseline to be compared at a later time with the second set of observations collected after the feedback intervention aspect of the in-service program.

Sample

Usable data were obtained from 306 classrooms recently effected by the Detroit court-ordered desegregation. This included the classrooms of 158 elementary teachers, 99 middle school teachers and 49 high school teachers. One hundred and sixty-one of these teachers were Black and 145 of the teachers were white, while 67 were male and 239 were female. Table 1 presents a further breakdown of the teachers by sex, race and grade level.

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Insert Table 1 About Here

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The sample of teachers was heterogeneous in terms of age, experience and subject matter taught. The average age of the teachers and years of teaching experience were 37.48 years (S.D.=11.15) and 12.04 years (S.D.=8.75), respectively. White teachers tended to be older ($\bar{x}$ age= 40.83) than Black teachers ($\bar{x}$ age=34.97) and white teachers tended to have more years of teaching experience ($\bar{x}$=15.00 yrs.) than Black teachers ($\bar{x}$=9.70 yrs.). While subject matter taught by teachers was not a major concern of this study, there was considerable variation in the academic subjects taught during the classroom observations.

Data Collection

All teachers who attended one of the several weekend meetings were approached by the trained coders who were part of the weekend meeting staff to schedule an observational time for the following week. The nature of the classroom observations was explained to teachers as an opportunity to gain more knowledge about their classroom interaction patterns and instructional styles. Teachers were told that the data from individual observations could only be meaningfully interpreted relative to each teachers' lesson goal and that the data were most meaningful to teachers only when collected during an uncontrived teacher-student lesson exchange.

Coders went to teachers' classrooms according to the prearranged schedule and were generally introduced by teachers to the students as "someone wanting to observe the class" and were seated in an unobstrusive position to the side of the classroom. After briefly

familiarizing themselves with the classroom procedures and with the subject of discussion, the coders would record the date, subject matter, time, teacher sex and race, student sex-race composition in the class and begin to code teacher-student verbal interactions.

Only classroom observations of ten minutes or longer were included in the data analysis, with the length of classroom observations ranging from 10 minutes to 43 minutes with a mean observation time of 21.79 minutes and a standard deviation of 6.65 minutes.

The observational instrument was a modified version of the Brophy-Good Dyadic Interaction Observation System (Brophy & Good, 1970). This system yields a variety of qualitative and quantitative measures of student-teacher interactions, separately recorded for each student in the class. The coding procedure was modified for this study in order to distinguish among behaviors associated with individual students of various ethnic groups. Only public classroom behaviors directed to or from individuals of the class were coded. Each time an interaction was coded the sex and race of the student participating in that interaction was also coded.

While the Brophy-Good Dyadic Interaction System is generally well known, it should be pointed out that the system records three basic types of teacher-student interactions. Categories 1-13 refer to academic response opportunities. Of the academic response opportunities, the number of process questions and the number of product questions are categories of types of teacher questions. Process questions require students to verbally explain the problem-solving

steps or strategies used in arriving at a conclusion, while product questions require a single word or short answer from students usually reporting facts from memory.

Categories 14-18 refer to teacher questions or statements dealing with routine classroom management and procedures, and categories 19-24 refer to student initiated interaction. Most of the teacher-student interactions variables are self-evident from their titles.

Reliability for the 14 coders was obtained by having each of the observers code a 15 minute videotape recording of a fifth grade math lesson. While this was not the most desirable method, it was the only one available for this particular study. Reliability was computed as the number of agreements divided by the number of agreements plus disagreements plus omissions multiplied by 100 for each pair of observers. The average reliability was 80%. The primary reason for the low reliability was the difficulty encountered by the observers in attempting to code the sex of the student. This was particularly difficult because the videotape camera was situated in the back of the room and voice tone was often the only cue possible in obtaining the sex identification. Observers reported that they had no problems coding the race and sex variables in the classroom setting.

Data Preparation and Analysis

The raw data from the Brophy-Good Dyadic Interaction Observation System were modified to allow for the analysis of possible disproportionate instructional opportunities among teachers and students of

different racial groups. Raw scores of each category of student sex and race were transformed into a standardized score based on that group's representation within a given observational category proportionate to its representation of students in the classroom. The standardized scores were calculated by using the following formula:

$$\text{Standardized Score} = \frac{\text{Total Number of Interactions for variable in a given student sex-race category}}{\text{Total Number of Interactions for Variable X}} \times \frac{\text{Total Number of Students in the Class}}{\text{Total Number of Students in the sex-race category}}$$

where variable x equals for example response opportunity category such as product question.

Calculations of these standardized scores were done only in instances where a particular interaction observational category occurred during the classroom observations and where students of a particular sex-race category were present at that time.

Results

The effects of student and teacher sex and race on teacher-student interactions were examined in a series of four-way ANOVA tests. Five of the student-teacher interaction categories were eliminated from the analyses, however, because the frequency of occurrence in behaviors in these categories was too low for meaningful statistical analysis. The categories eliminated were: teacher ignore student behavior, teacher non-intervene in student behavior, teacher praise

student behavior, teacher selected discipline target of student behavior, teacher criticize student initiated behavior. The first four were non-academic student-teacher interaction categories, while the fifth was a student-initiated behavior.

Table 2 shows the number of standardized dependent variables (out of a total of 19) for which each effect reached statistical significance ($p<.05$). To illustrate the impact of the various main effects and interactions, the binomial probabilities for obtaining N/19 repeated significant tests is also shown in Table 2. (This binomial probability should be interpreted cautiously, however, since, to a degree, the dependent variables were correlated with each other).

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Insert Table 2 About Here

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For the standardized variables, the number of total main effects reaching the .05 level (11 of 19) was in itself significant, based on the binomial theorem ($p<.0001$). On the one-way tests, sex and race of student proved to be potent classifying variables for nonacademic behaviors. In every case where student sex was found to be a significant variable, males received a greater proportion of the variable than females, (e.g., males received a greater proportion of product questions than females). A similar consistency was found for the race variable, with Black students engaging in instructional activities to a greater extent than white students on each dependent variable which was significant in the ANOVA.

The mathematical computation of the standardized variables suppressed differences between teachers. The standardizing was done within each individual teacher's class rather than between the classes of different teachers. Where one standardized variable was low (or high) for a particular student race-sex combination in a specific teacher's class, other student race-sex combinations for that variable had to be high (or low) in roughly an equal but opposite direction. For any given standardized variable, after allowing for rounding and skewedness errors, the mean for all possible student race-sex combinations in any given teacher's class would be 1.0; thus, the ANOVA tests would be unable to discern any significant main effects based solely on teacher sex or race. The tests could, of course, still detect interactions between student and teacher characteristics. The main statistical advantage of the standardized variable is to provide an accurate picture of the first order interaction effects in a way which controls for the variations in rate due solely to teacher characteristics.

Two of the two-way interactions were significant often enough that the number of significant tests was in itself significant: race of student by race of teacher (7 of 19 tests significant, $p<.0001$ under the binomial theorem), and race of student by sex of teacher (5 of 19 tests significant, $p<.002$ under the binomial theorem). In both cases, the majority of the significant two-way interactions occurred in the academic response dependent measure variables.

A series of Newman-Keuls (Winter, 1971) contrast tests were performed on significant two-way interactions. These tests compared the differences between means for each of the six possible comparisons for the four groups entering into the significant two-way interactions.

The results of these tests are presented in Table 3. In general, they tend to show a "cross-race" effect, with the group means being lower for teachers of the same race as the student than for teachers of a different race from the student. All of the significant results presented in Table 3 are on academic variables and occurred on just three dependent variables: product questions, student gave incorrect answer, and teacher gave answer. Newman-Keuls tests on the student behavioral and student initiative variables produced no significant results.

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Insert Table 3 About Here

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The pattern of differences detected in the significant Newman-Keuls tests were almost universally present in all thirteen of the academic variables, even though the statistical tests were not significant on all of them. The "cross race" means were almost always higher than the "same race" means.

Discussion

Main effect analyses showed that where a main effect was significant for race of student, in every case Black students received a greater proportion of the variable than white students. Thus Blacks

received a greater proportion of product questions, gave no response to more questions, received more criticism from teachers for their behavior, had more self-initiated questions or relevant comments, were the recipients of greater teacher non-acceptance of a student question or response and received more teacher feedback to a student question or response. This finding is in conflict with the results presented by Gay (1974) and by Rubovits and Maehr (1973) which showed that white students received far more attention from teachers than Black students. In the Rubovits and Maehr (1973) study the teachers were all white pre-service teachers whereas the teachers in this sample were all working teachers of which 53% were Black. In most classroom studies where race has been an important variable the effects have not been analyzed in terms of student race (e.g. Barnes, Note 6; Byalick & Bersoff, 1974) and few other studies exist to clarify these conflicting results. Clearly more data will be needed before this effect is understood.

The main effect analysis of the sex variable showed that male students received a greater proportion of instruction than female students. This was true for each of the following 12 cases in which statistical significance was obtained: product questions, students not volunteering, students did volunteer, student gave correct answer, student gave incorrect answer, teacher criticized student answer, teacher asks a new question, teacher criticizes behavior, student asks a question or makes a relevant response, student asks an irrelevant question or makes an irrelevant response, teacher doesn't accept a

student question or response, and teacher gives feedback to a student question or response. These results are highly consistent with those obtained by Good, Sikes & Brophy (1973). The variables on which significance was obtained also illustrates that male students both initiated more instructional contact from teachers and that teachers initiated more instructional contact with males than with females.

The lack of any significant 2-way interactions involving the teacher sex and student sex variables suggests clearly that while male and female students behave differently in the classroom that male and female teachers treat male and female students similarly. Thus the same pattern of greater activity by males occurs in the classrooms of both male and female teachers, and the same pattern which has been shown to occur repeatedly with female teachers (Good, Sikes & Brophy, 1973) also occurs with male teachers. The arguments of some educators calling for the sexual balancing of teaching staffs based upon the notion of differential teacher behavior as a function of teacher and student sex variables (Grambs & Waetjen, 1966; McNeil, 1964; Peltier, 1968) derives no support from the present data.

Analysis of the race of teacher by race of student interaction showed that Black students of white teachers as compared with white students of white teachers received greater proportions of the following variables: product questions, student gave incorrect answer and teacher repeated the question. On all of the other possible interactions no significant differences were obtained suggesting that on

the whole the interaction patterns between Black and white teachers and Black and white students are far more similar than they are different. Similar findings have been reported by other researchers (e.g. Barnes, 1973 ; Mangold, 1974) wherein they report that only a very small number of significant differences were observed in the interaction of teacher and student races.

It is the case however, that the "cross race pattern" found in the significant Newman-Keuls tests were universally present, though not significant in all of the thirteen academic variables. This pattern should be more closely examined in future research in this area, as it is consistent with the findings of other research (Brown, Payne, Lankewich & Cornell, 1970; Byalick & Bersoff, 1974). One possible explanation for its occurrence in this study would be the possibility that white teachers overcompensated in their interactions with Black children in an attempt to make the patterns appear to be equal. Though the teachers did not know the details of the observation system or the particulars of what the observers were looking at, surely they had the expectation that in recently desegregated schools, the instructional opportunities presented in the classroom should be proportionately distributed among Black and white equally.

The race of teacher, sex of student interaction resulted in the finding that Black students of female teachers received more product questions than white students of female teachers and that Black students of female teachers gave more correct answers than did Black

students of male teachers. Because of the small number of effects which were found to be significant concerning the interaction of those variables the authors suggest that not too much importance ought to be attached to these results unless they are replicated by further studies.

Because the number of significant effects were lower than chance as determined by the binomial theorem none of the means in the other significant interactions were subjected to post hoc comparisons. Thus when looking at the patterns of classroom interaction as a function of race and sex of student, sex of student and race of teacher and race and sex of teacher, the interaction patterns appear to be indistinguishable.

The results of this study clearly indicated that Black students and males received a greater proportion of the classroom interactions than did white students or females; that both male and female teachers acted in very similar ways with male and female students; and that there exists the possibility of a "cross race" effect between white teachers and their students with Black students receiving more than their fair share of the interactions.

On the whole these results present a very mixed bag. On the one hand one does not find a blatant kind of discrimination either in terms of sex or race discrimination; on the other hand many of the findings which were obtained are important enough in terms of the educational and societal consequences to be of concern to educators, parents and researchers alike.

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Table 1. Distribution of Teachers in Sample By Sex, Race And Grade Level

Grade Level	Black		Whites		
	Males	Females	Males	Females	Totals
Elementary (Kdg-5th)	3	84	11	60	158
Middle School (6th-8th)	12	40	22	25	99
High School (9th-12th)	4	18	15	12	49
Totals	19	142	48	97	306

Table 3

Statistically Significant Comparisons
On the Newman-Keuls Tests

DEPENDENT VARIABLE	GROUP WITH LOW MEAN	GROUP WITH HIGH MEAN	q	d.f.	sig.
PRODUCT QUESTIONS	WHITE TEACHERS WHITE STUDENTS	WHITE TEACHERS WHITE STUDENTS	3.753	4,1122	.05
INCORRECT ANSWER	WHITE TEACHERS WHITE STUDENTS	WHITE TEACHERS BLACK STUDENTS	3.984	4,871	.05
REPEATED QUESTION	WHITE TEACHERS WHITE STUDENTS	WHITE TEACHERS WHITE STUDENTS	3.726	4,589	.05
PRODUCT QUESTIONS	FEMALE TEACHERS WHITE STUDENTS	FEMALE TEACHERS BLACK STUDENTS	3.764	3,1122	.05
CORRECT ANSWER	MALE TEACHERS BLACK STUDENTS	FEMALE TEACHERS BLACK STUDENTS	3.805	4,1116	.05